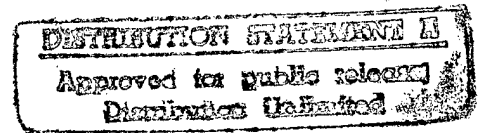


CORRECTED FINAL REPORT (EXECUTIVE SUMMARY)

**HIGH TEMPERATURE HOT WATER
DISTRIBUTION SYSTEM STUDY**

Prepared for



**DIRECTORATE OF PUBLIC WORKS
FORT DRUM, NEW YORK**

Under

19971021 304

CONTRACT NO. DACA01-94-D-0033
DELIVERY ORDER NO. 0013, MODIFICATION NO. 1

EMC No. 1406-013

December 1996

EMC QUALITY INSPECTED 2

E M C ENGINEERS, INC.
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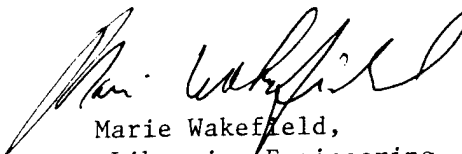
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Fort Drum HTHW Study

EXECUTIVE SUMMARY

INTRODUCTION

The existing High Temperature Hot Water (HTHW) Distribution System has been plagued with design and construction deficiencies since startup of the HTHW system, in October 1988. In October 1989, after one year of service, these deficiencies were outlined in a technical evaluation. The deficiencies included flooded manholes, sump pumps not hooked up, leaking valves, contaminated HTHW water, and no cathodic protection system.

This feasibility study of the High Temperature Hot Water (HTHW) Distribution System was performed under Contract No. DACA01-94-D-0033, Delivery Order 0013, Modification 1, issued to EMC Engineers, Inc. (EMC), by the Norfolk District Corps of Engineers, on 25 April 1996. The purpose of this study was to determine the existing conditions of the High Temperature Hot Water Distribution System, manholes, and areas of containment system degradation.

The study focused on two areas of concern, as follows:

- Determine existing conditions and areas of containment system degradation (leaks) in the underground carrier pipes and protective conduit.
- Document the condition of underground steel and concrete manholes.

To document the leaks, a site survey was performed, using state-of-the-art infrared leak detection equipment and tracer gas leak detection equipment. To document the condition of the manholes, color photographs were taken of the insides of 125 manholes, and notes were made on the condition of these manholes.

STUDY/SURVEY RESULTS

The survey revealed a system with some immediate problem areas, and also identified areas of future problems, which could be addressed now, to avoid major problems. A HTHW system failure occurring in the middle of winter could be disastrous, causing the new Post heating system to be shut down. The study revealed infiltration of ground water into conduits, wet insulation, and flooded manholes. Conduit and carrier pipes are corroded. Manholes are in desperate need of repair. The cathodic protection system is not fully functional.

ENERGY CONSERVATION ANALYSIS

The net heat loss calculated, based on the difference between a new thermally efficient system and the existing losses determined by field measurements, was 11,194,736 Btu/hour. From the study, Fort Drum developed 20 stand-alone projects, which will bring the existing failing system into a reliable working system. A summary of the projects follows:

<u>Description</u>	<u>Estimated Construction Cost (\$ Thousand)</u>
Cathodic Protection (SIR 70)	\$ 80.3
JOB #3 Mt. Belvedere (SIR 3.14)	\$1,351.2
JOB #4 North Riva Ridge	\$ 518.4
JOB #5 10600 Area	\$ 367.1
JOB #6 P-10000	\$ 96.1
JOB #7 Fire Station	\$ 108.6
JOB #8 P-10100	\$ 166.6
JOB #9 Second Street West	\$ 324.8
JOB #10 Bowling Alley	\$ 324.5
JOB #11 Guthrie Service	\$ 145.1
JOB #12 Manhole 40-1, P-10510	\$ 24.7
JOB #13 JA Jones, Manhole 19	\$ 396.6
JOB #14 10100 Area	\$ 219.6
JOB #15 10400 Area Conduit	\$ 203.9
JOB #16 Manholes 10200 Area	\$ 211.3
JOB #17 Manholes 4400 Area	\$ 289.0
JOB #18 Manholes 10400,10500	\$ 205.7
JOB #19 Manholes 10600 Area	\$ 178.5
JOB #20 Manholes 10100/11000 Area	\$ 188.7
JOB #21 Manholes 10700 Area	\$ <u>119.0</u>
 TOTAL CONTRACT COST	 \$5,519.7
 ESTIMATED CONTRACT COST (ROUNDED)	 \$5,520
CONTINGENCY PERCENT (6.00%)	\$ 331
 SUBTOTAL	 \$5,851
SIOH (6.00%)	\$ 351
 TOTAL (ROUNDED)	 \$6,200

CONCLUSIONS

An extensive investigation into alternate systems (such as natural gas) is not warranted. The cost of repairing of the existing system is much lower than the cost for a new natural gas system (estimated \$19.2 Million). The existing HTHW distribution would not survive long enough to allow for the installation of an alternative system. The Government has a long-term commitment with a third party contract, to provide HTHW service to the new post. Where energy savings have been calculated, the results have been very favorable, with SIRs of 3.14 to 4.56.